ABSTRACT OF THE DISCLOSURE

A capacitor is provided that is optimal for use in DRAM and has high dielectric constant, and allows leakage current flowing therethrough to be maintained at a low level, and further, permits dependence of the leakage current on temperatures to be small. That is, capacitor openings are formed in an interlayer silicon oxide layer and a TiN film is patterned so that TiN films are left only within the openings to form lower electrodes within the openings. Subsequently, a Zr- and/or Hf-containing oxide film (represented by the formula, multicomponent Zr.sub.x.Hf.sub.1-x.O.sub.2 film ($0 \leqq x \leqq 1$)) formed from a metal-containing organic compound as a reactant and a Ti-containing oxide film are laminated to form capacitor dielectrics. After deposition of the Zr- and/or Hf-containing oxide film, the Zr- and/or Hf-containing oxide film is subjected to heat treatment to be performed in an oxidizing ambient to remove residual carbon being retained in the Zr- and/or Hf-containing oxide film, leading to formation of a capacitor that is optimal for use in DRAM and has high dielectric constant, and allows leakage current flowing therethrough to be maintained at a low level.